3.3 b more rules for derivatives

$$\frac{d}{dx}\sin x = \cos x$$

$$\frac{d}{dx}\cos x = -\sin x$$

$$\frac{d}{dx}\left(x^2+1\right)\left(x^3-2x\right) = \left(x^2+1\right)\left(3x^2-2\right) + \left(x^3-2x\right)2x$$

$x^5-2x^3+x^3-2x$

x^5-x^3-2x

$$= 3x^4-2x^2+3x^2-2+2x^4-4x^2$$

$$= 5x^4-3x^2-2$$

book product rule p 119

$$\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$$

Quotient Rule p 120

$$y = \frac{x^2+1}{3x-2} \qquad y' = ?$$

$$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$$

$$\frac{d}{dx}\left(\frac{x^2+1}{3x-2}\right) = \frac{(3x-2)2x-(x^2+1)\cdot 3}{(3x-2)^2}$$

$$= \frac{6x^2-4x-3x^2-3}{(3x-2)^2}$$

$$= \frac{3x^2-4x-3}{(3x-2)^2}$$

$$\frac{d}{dx}\left(\frac{x \sin x}{x^3+4}\right) = .$$

$$\frac{(x^3+4)(x\cos x + \sin x \cdot 1) - x\sin x \cdot 3x^2}{(x^3+4)^2}$$

$$\frac{d}{dx}\left(\frac{(x^2+1)(x^3-2)}{x^2\sin x}\right)=$$

$$\frac{x^2\sin x\left((x^2+1)3x^2+(x^3-2)2x\right)-(x^2+1)(x^3-2)\left(x^2\cos x+\sin x\,2x\right)}{(x^2\sin x)^2}$$

bottom · der of top + top · der of bottom

bottom^2

3.4 | particle moving on a line

$s(t)$ position

$\frac{ds}{dt} = s'(t)$ velocity

$\frac{d^2s}{dt^2} = s''(t)$ acceleration

speed = $|\text{velocity}|$

EX 4 p 130 $s = 160t - 16t^2$ ft

$v = 160 - 32t$ ft/sec

$a = -32$ $\frac{ft/sec}{sec}$ or ft/sec^2

a) $v = 0$ at top

$160 - 32t = 0$

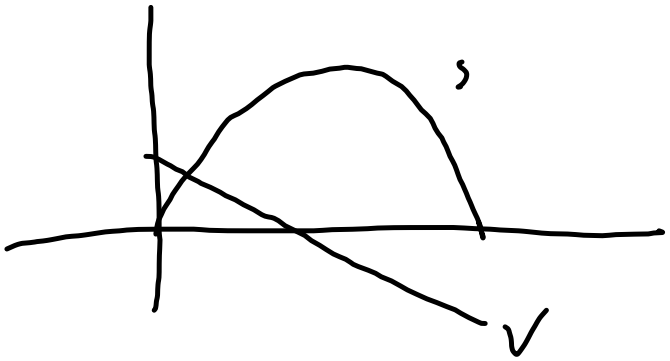
solve for t $5 = \frac{160}{32} = 32t$

$160(5) - 16(5^2) = 400$ ft

b) $256 = 160t - 16t^2$

solve for t $t = 2, 8$

$v(2) = 96 \frac{ft}{sec}$ $v(8) = -96 \frac{ft}{sec}$



parametric equations

add graphs & geo

menu, graph type, parametric

Ex 5 $X1(t) = t^2 - 4t + 3$

$Y1(t) = 2$

graph,

menu, trace, graph trace

arrows, shows path of particle